1991 FISHERIES STATISTICS

LAKE KARIBA - ZIMBABWE SHORE

by:

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LAKE KARIBA FISHERIES RESEARCH INSTITUTE

KARIBA

PROJECT REPORT NO. 70

DEPARTMENT OF NATIONAL PARKS AND WILDLIFE MANAGEMENT

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SUMMARY : LANDINGS

1.The Pelagic Fishery (Sardines)

AREA	CATCH IN TONNES	
	1990	1991
KARIBA	11 143	9 868
BUMI	196	92
CHALALA	5 977	4 893
SENGWA	2 692	2 713
BINGA/MLIBIZI	1 752	1 740
TOTAL	21 757	19 306

Catches on the Zambian side for 1991 = 6 754 tonnes
1991 Total sardines catches for Lake Kariba = 26 060 tonnes

2. The Inshore Fishery

AREA	CATCH IN TONNES	
	1990	1991
Gache Gache	58	38
Nyaodza	29	31
Fothergill	26	27
Area C2	244	203
Luando Co-op	31	34
Area c4 Bumi	160	212
Area c5	88	78
Area c6 and c7	-	22
TOTAL	636	645

Total catch by inshore fishermen extrapolated for the Zimbabwean side is 1 201 tonnes (enumeration data). However, total catches estimated from purchases give a figure of 1747 tonnes. The later was used in all calculations.

GRAND TOTAL is 19 306 (pelagic) + 1 747 (inshore) + 112 (tigerfish by-catch) = 21 065 tonnes

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PART 1: THE PELAGIC FISHERY

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PART 1.
THE PELAGIC FISHERY

THE PELAGIC FISHERY

Introduction

The Pelagic Fishery is based on the freshwater sardine *Limnothrissa miodon* and by-catches of the tigerfish *Hydrocynus vittatus*.

The fishing operations are based at 6 areas, Kariba, Bumi, Chalala, Binga, Mlibizi and Sengwa (Figure 2). Kariba and Chalala produce 75% of the total yield (Fig 1).

There are 231 units issued on the Zimbabwean side. Each unit is equal to one rig. All units but two are in operation. The total catch for 1991 in the sardine fishery was 19 306 tonnes. There has been a decline of over 2 000 tonnes from the 1990 catches. Poor rainfalls in 1991 could be responsible for the decline in catches.

Later in the year there were a number of thefts reported. Catches lost this way were estimated to be at most 500 tonnes.

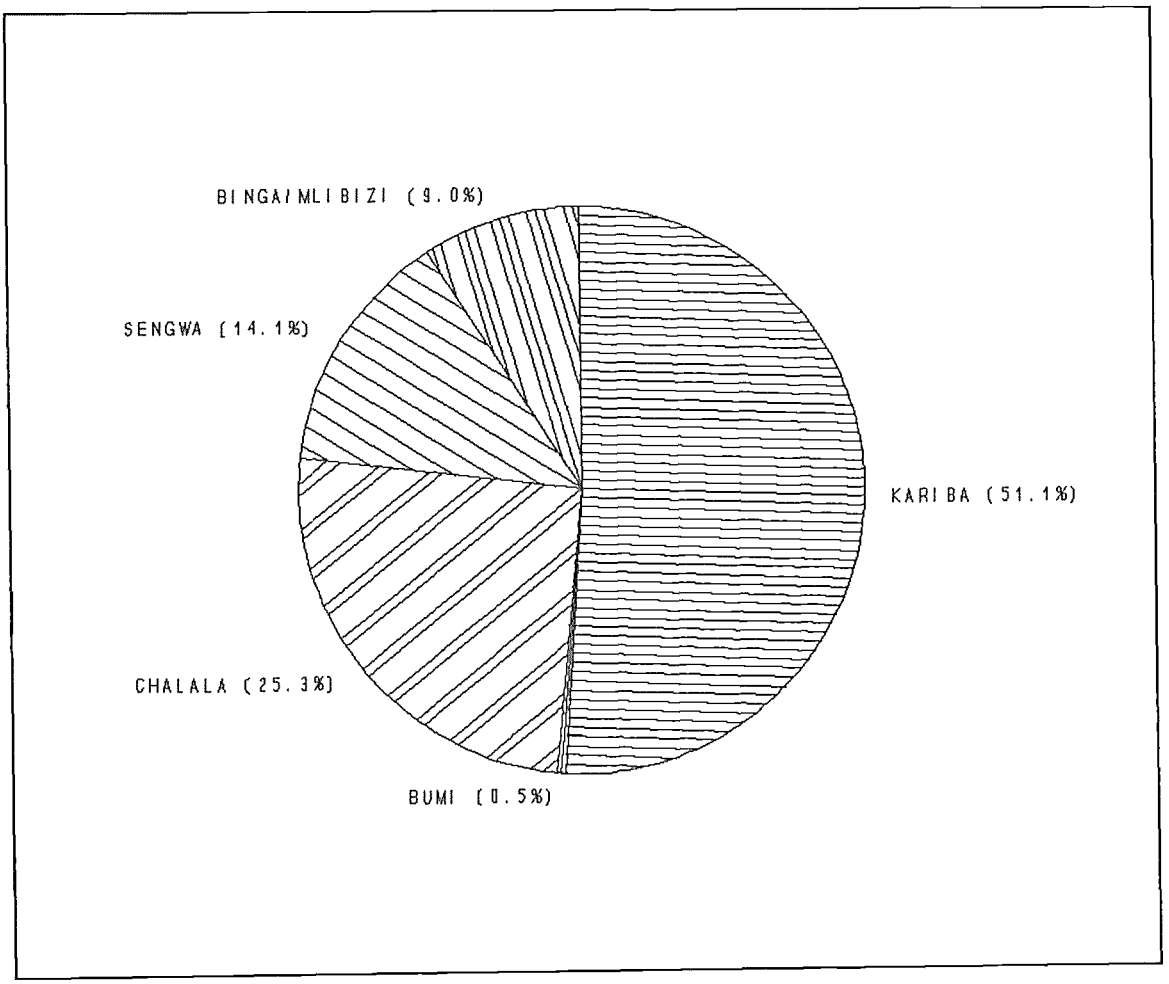


FIGURE 1. % LANDINGS OF SARDINE BY AREA

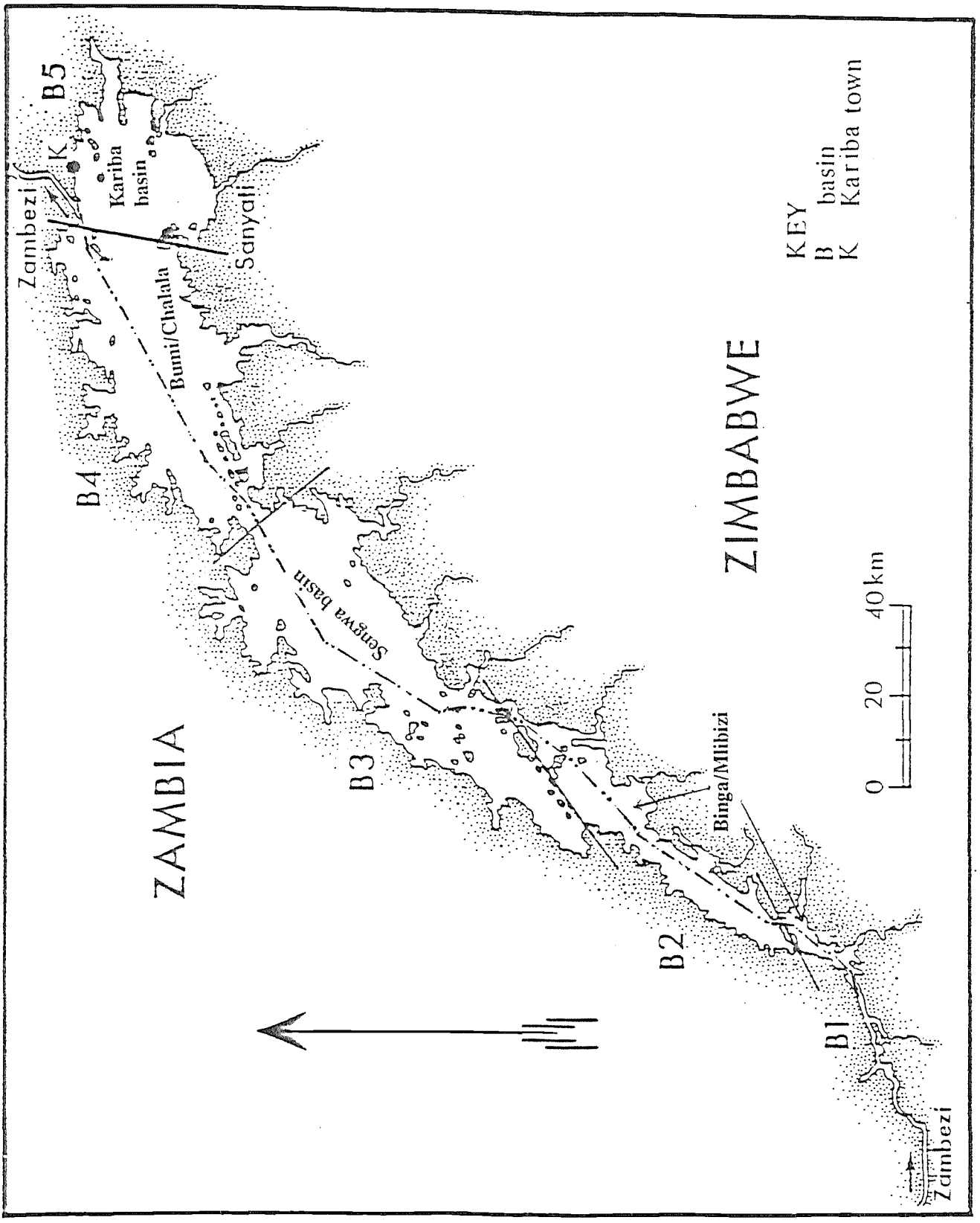


FIGURE 2: Lake Kariba showing Sardine Fishing Areas

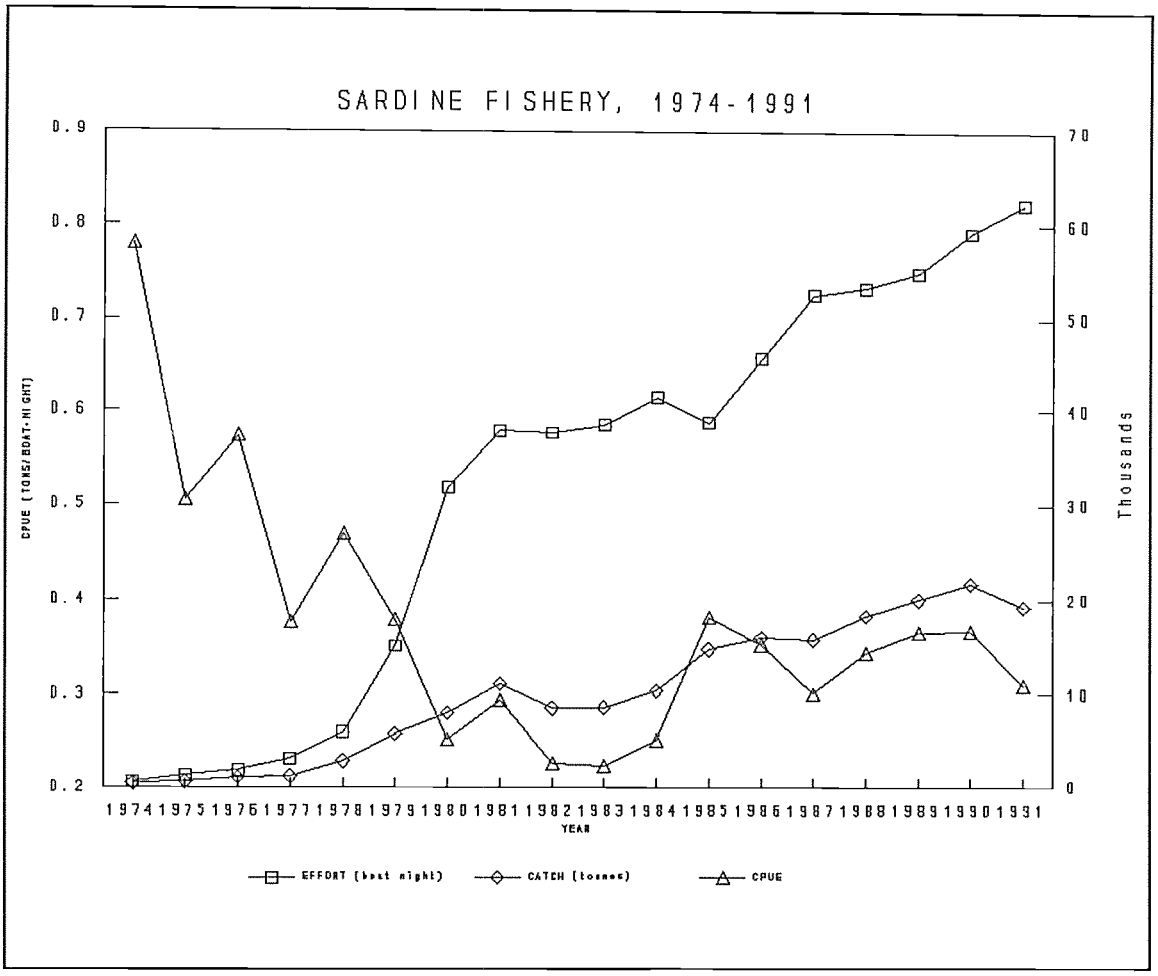


FIGURE 3. TRENDS IN THE SARDINE FISHERY 1974-1991.

Figure 3 show the trends in the sardine fishery from 1974-1991. The total catch has been increasing since the fishery started. A depression appeared during the drought period 1981 to 1985. The catch per unit effort (CPUE) shows a steady decline from 1974 to 1983 this is due to more people joining the fishery. From 1984, the CPUE increased slightly to more or less stable state. This increase could be a result of increase in efficiency as more operators started using echo-sounders and hydraulic winches. The effort in the fishery is also steadily increasing.

TABLE 1. LANDINGS (tonnes) OF SARDINE : LIMNOTHRISSA MIODON 1974-1991

YEAR	AREA					TOTAL
	KARIBA	BUMI	CHALALA	SENGWA	BINGA/ MLIBIZI	
1974	488					488
1975	656					656
1976	1050					1050
1977	1172					1172
1978	2770			35		2805
1979	5475	78	8	75	96	5732
1980	5938	173	1261	115	465	7952
1981	7408	285	2879	175	390	11137
1982	5249	234	2544	113	310	8450
1983	5590	170	2516	96	176	8548
1984	6286	305	3417	74	312	10394
1985	9179	338	4658	105	306	14586
1986	9077	369	4912	944	445	15747
1987	8194	288	4847	1832	662	15823
1988	8799	186	5975	2513	893	18366
1989	10199	146	6036	2438	1293	20112
1990	11143	194	5977	2692	1752	21758
1991	9867	92	4893	2714	1740	19306

The Sengwa fishery includes Sengwa and Chibuyu
The Binga fishery includes Binga and Mlibizi

TABLE 2: TOTAL EFFORT (UNIT-NIGHT) IN THE SARDINE FISHERY 1974-1991.

YEAR	AREA					TOTAL
	KARIBA	BUMI	CHALALA	SENGWA	BINGA/ MLIBIZI	
1974	616					616
1975	1298					1298
1976	1833					1833
1977	3114					3114
1978	5877			96		5973
1979	14003	195	43	324	543	15108
1980	22775	789	6046	586	1551	31747
1981	24393	1770	9953	668	1188	37972
1982	23816	1467	10560	539	1394	37776
1983	24481	1036	11643	642	1063	38865
1984	25112	1077	13253	499	1293	41234
1985	24245	1155	14319	449	1235	41403
1986	26153	1245	15140	1688	1564	45790
1987	29702	1410	15966	3544	1792	52414
1988	29501	1002	16120	4356	2424	53403
1989	28670	887	16716	4957	3689	54919
1990	31160	952	16854	5396	4831	59193
1991	33133	666	17255	6314	4840	62208

TABLE 3: CATCH PER UNIT EFFORT (T/UNIT-NIGHT OF SARDINE) 1974-1991.

YEAR	AREA					ALL AREAS
	KARIBA	BUMI	CHALALA	SENGWA	BINGA/ MLIBIZI	
1974	0.78					0.78
1975	0.51					0.51
1976	0.57					0.57
1977	0.38					0.38
1978	0.47				0.36	0.47
1979	0.34	0.40	0.19	0.26	0.18	0.37
1980	0.26	0.22	0.21	0.20	0.31	0.25
1981	0.30	0.17	0.29	0.26	0.23	0.29
1982	0.22	0.16	0.25	0.21	0.24	0.23
1983	0.23	0.16	0.22	0.18	0.17	0.22
1984	0.25	0.28	0.26	0.17	0.24	0.25
1985	0.40	0.36	0.30	0.23	0.27	0.36
1986	0.35	0.26	0.36	0.53	0.30	0.35
1987	0.26	0.15	0.30	0.50	0.36	0.30
1988	0.29	0.19	0.37	0.58	0.37	0.34
1989	0.36	0.16	0.36	0.49	0.35	0.37
1990	0.36	0.20	0.35	0.50	0.36	0.37
1991	0.29	0.13	0.28	0.43	0.35	0.31

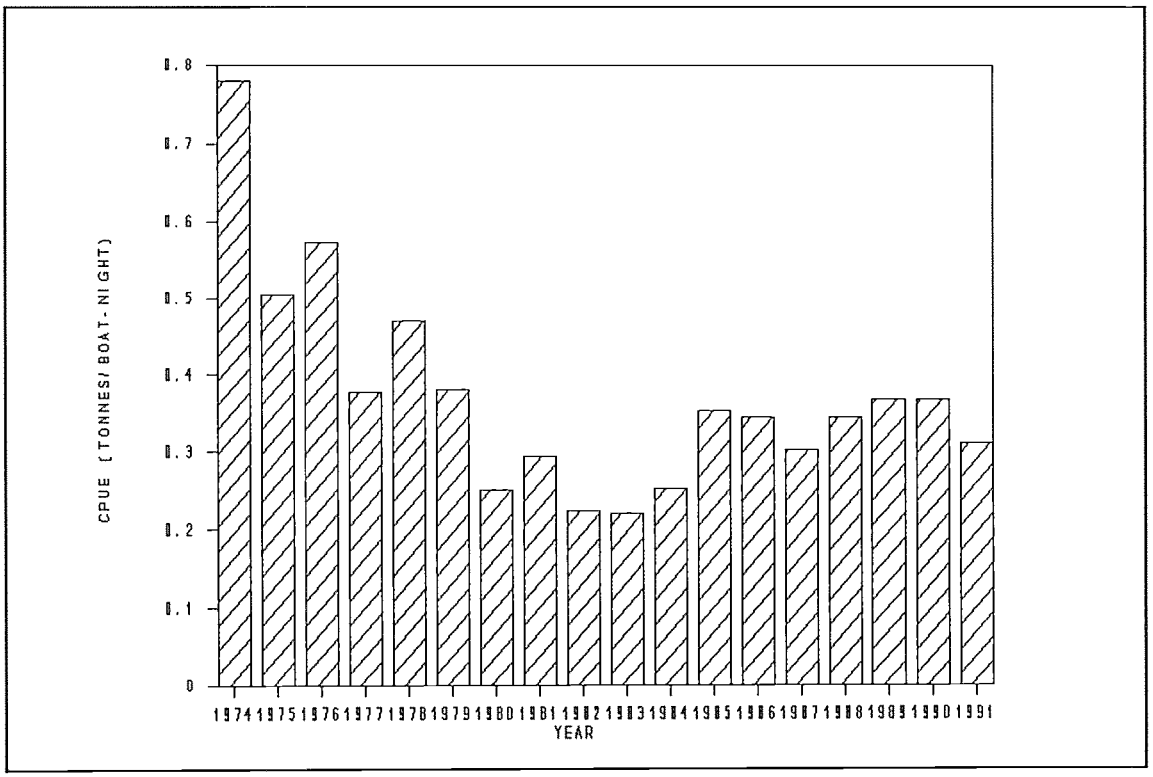


FIGURE 4. CATCH PER UNIT EFFORT (T/UNIT-NIGHT OF SARDINE) 1974-1991.

TABLE 4: BY-CATCHES (TONNES) TIGERFISH *HYDROCYNUS VITTATUS*, 1974-1991.

YEAR	AREA					TOTAL
	KARIBA	BUMI	CHALALA	SENGWA	BINGA/ MLIBIZI	
1974	18					18
1975	81					81
1976	91					91
1977	138					138
1978	129			1		130
1979	64	1		3	2	70
1980	41	1		2	5	49
1981	54	6	2	1	2	65
1982	44	3	1	1	1	50
1983	45	4	3	1	1	54
1984	22	2	2	-	1	27
1985	22	1	2	1	-	26
1986	40	2	19	3	3	67
1987	31	2	6	3	2	44
1988	8	1	3	1	2	15
1989	11	0.5	4	1	3	19.5
1990	14	0.5	4	3	5	26.5
1991	8	0	2	1	1	12

Note: Tigerfish landings are not accurate. The fishermen rarely submit all their tigerfish to their employers but the landings give a general trend.

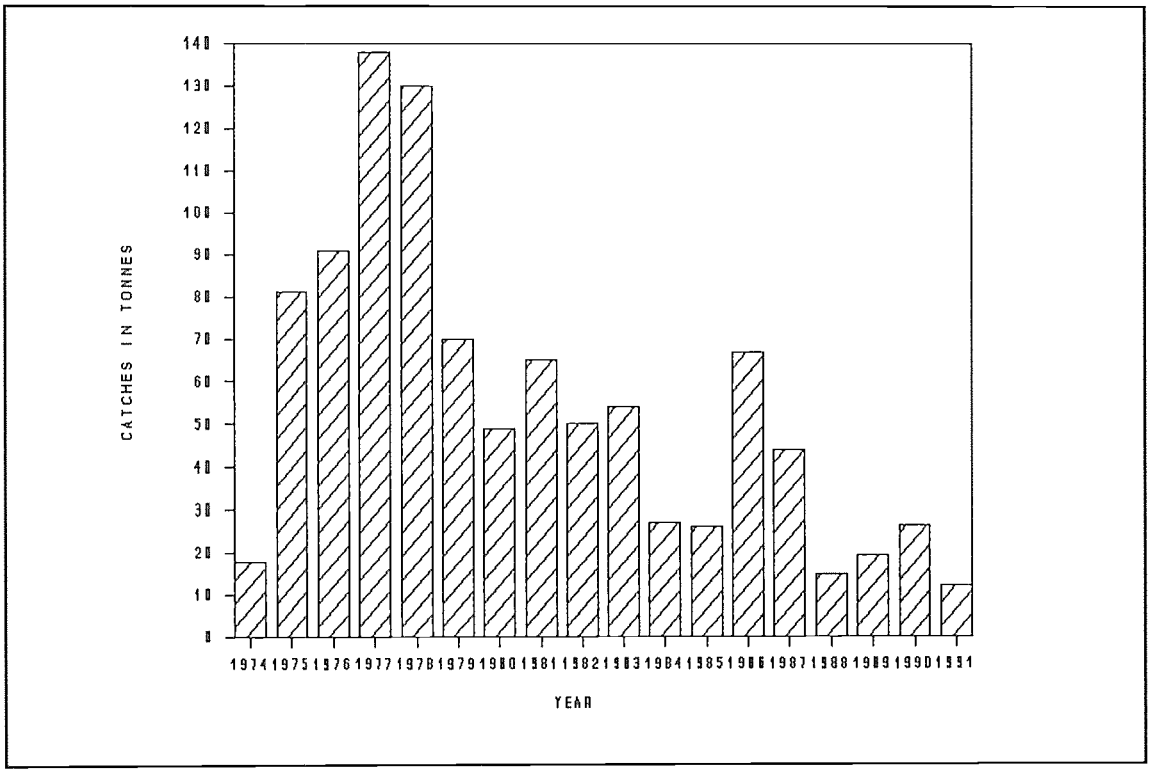


FIGURE 5. CATCHES OF *HYDROCYNUS VITTATUS* FROM THE PELAGIC ZONE, 1974-1991.

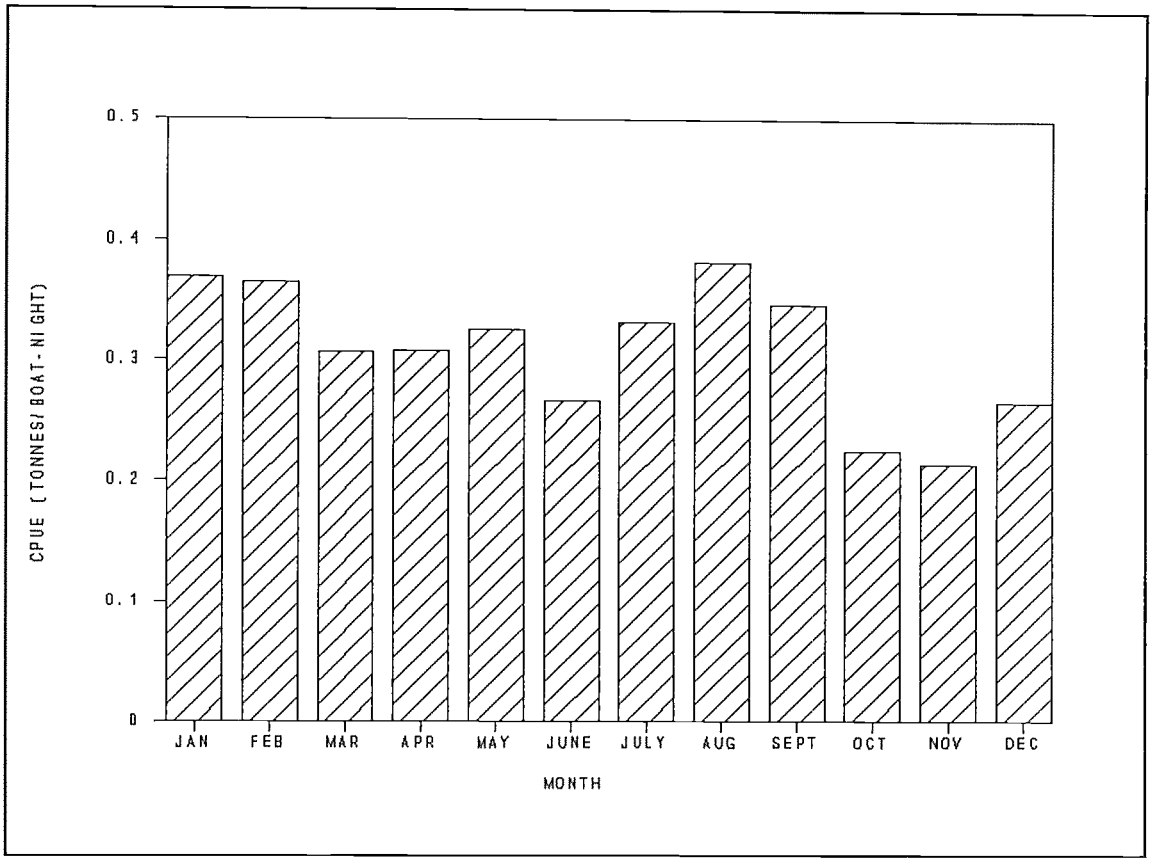


FIGURE 6. MONTHLY TRENDS FOR THE WHOLE LAKE 1991.

Monthly Trends In The Sardine Fishery.

Figure 6 show monthly trends in the sardine fishery for the year 1991. There are two peaks which appear in the annual cycle. One around February and the second around August /September. Possible reasons for the two peaks are recruitment (following spawning in the shallows).

PART II
THE INSHORE FISHERY

THE INSHORE FISHERY

The Inshore fishery utilizes gill-nets and exploits the indigenous Middle Zambezi fish. This fishery is restricted to the lake shore, generally at depths less than 10m.

The fishermen are based in fishing villages along the shore. There are 765 fishermen, consisting of 272 co-op members and 462 freelance fishermen. They are settled in 39 fishing villages, in the areas marked C1 to C7 (Figure 7).

10 villages are enumarated by LKFRI staff for ten (10) days every month. The data from these villages are extrapolated for the whole lake. Extrapolation is done simply by working out the average catch per fisherman per year and multiplying by 765 i.e the total number of fishermen on the Zimbabwean shore.

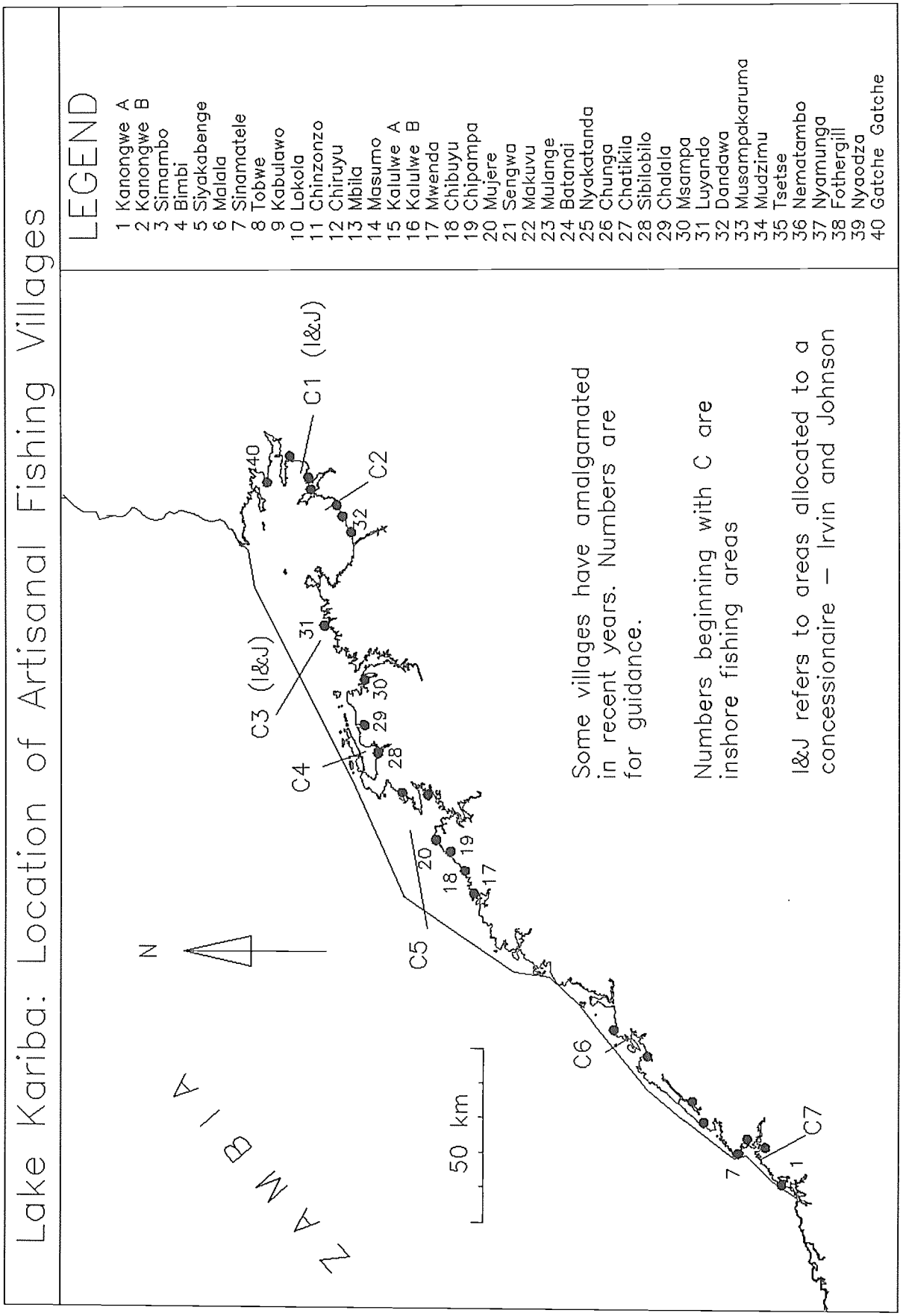
Where enumeration is done species composition is determined accurately. In other areas fish are grouped as follows:

"Bream" -cichlids, notably *Oreochromis mortimeri*, *Serranochromis codringtoni* and *Tilapia rendalli*
"Nchilla"-labeos, *Labeo altivelis* and *L. congoro*
"Chessa"-distichods, *Distichodus schenga* and *D. mossambicus*
"Tiger"- *Hydrocynus vittatus*
"Bottle fish"-mormyrids, notably *Mormyrus longirostris* and *Mormyrops deliciosus*
"Barbel"-catfish especially *Clarias gariepinus*. *Heterobranchus longifilis* and *Synodontis zambezensis*.

The total catch for the whole lake is shown in the summary on page (i). The Co-operatives in C1 submit monthly returns, I & J supply data from their area C5. The Binga District, Administration supply data from area C6 and C7. Effort in the inshore area is recorded as 100m net in one night. There are problems with this unit as fishermen have a tendency to under-report the actual number nets or net-length used. CPUE is measured as Kg/100 m net.

Fish poaching has been on the increase despite all efforts to curb it. It is felt that a significant catch is made, which unfortunately cannot be accounted for. Sport fishing also yields a substantial amount from the inshore. Methods are being sought so that these two landings can be accounted for.

FIGURE 7.


Lake Kariba: Location of Artisanal Fishing Villages
LEGEND
1 Kanongwe A
2 Kanongwe B
3 Simambo
4 Bimbi
5 Siyakabenge
6 Malala
7 Sinamatele
8 Tobwe
9 Kabulawo
10 Lokola
11 Chinzonzo
12 Chiruyu
13 Mbila
14 Masumo
15 Kalulwe A
16 Kalulwe B
17 Mwenda
18 Chibuyu
19 Chipampa
20 Mujere
21 Sengwa
22 Makuvu
23 Mulange
24 Batanai
25 Nyakatanda
26 Chunga
27 Chatikila
28 Sibilobilo
29 Chalala
30 Msampa
31 Luyando
32 Dandawa
33 Musampakaruma
34 Mudzimu
35 Tsetse
36 Nematambo
37 Nyamunga
38 Fothergill
39 Nyaodza
40 Gatche Gatche
Some villages have amalgamated in recent years. Numbers are for guidance.
Numbers beginning with C are inshore fishing areas
I&J refers to areas allocated to a concessionaire — Irvin and Johnson
N
ZAMBIA
50 km
C1 (I&J)
C2
C3 (I&J)
C4
C5
C6
C7

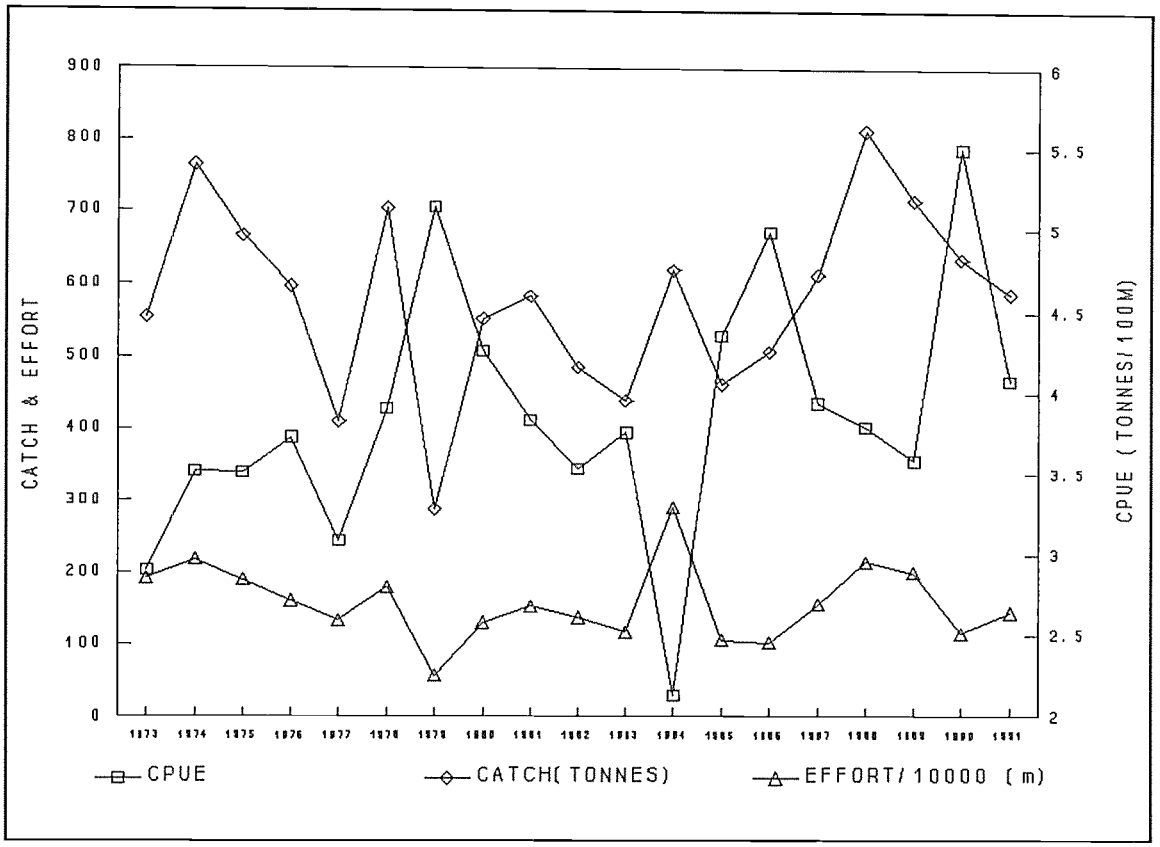


FIGURE 8. TRENDS IN THE INSHORE FISHERY, AREA C1-C5, 1973-1990.

TABLE 5

GACHE CO-OPERATIVE SOCIETY			
YEAR	EFFORT (M)	TOTAL CATCH (TON)	CPUE (KG/100M)
1985	2591639	71.70	2.76
1986	1636286	69.46	4.24
1987	3884326	66.68	1.71
1988	1526070	56.41	3.69
1989	125206	63.74	5.09
1990	973573	57.63	5.91
1991	1143188	38.15	3.33

TABLE 6

NYAODZA CO-OPERATIVE SOCIETY			
YEAR	EFFORT (M)	TOTAL CATCH (TON)	CPUE (KG/100M)
1986			
1987	2198277	44.31	2.01
1988	431295	16.88	3.91
1989	591000	21.21	3.58
1990	449587	28.92	6.43
1991	393120	31.19	7.93

TABLE 7

FOTHERGILL CO-OPERATIVE SOCIETY			
YEAR	EFFORT (M)	TOTAL CATCH (TON)	CPUE (KG/100M)
1987			
1988	645738	40.07	6.2
1989	393441	27.82	7.07
1990	467195	26.01	5.56
1991	421786	27.56	6.53

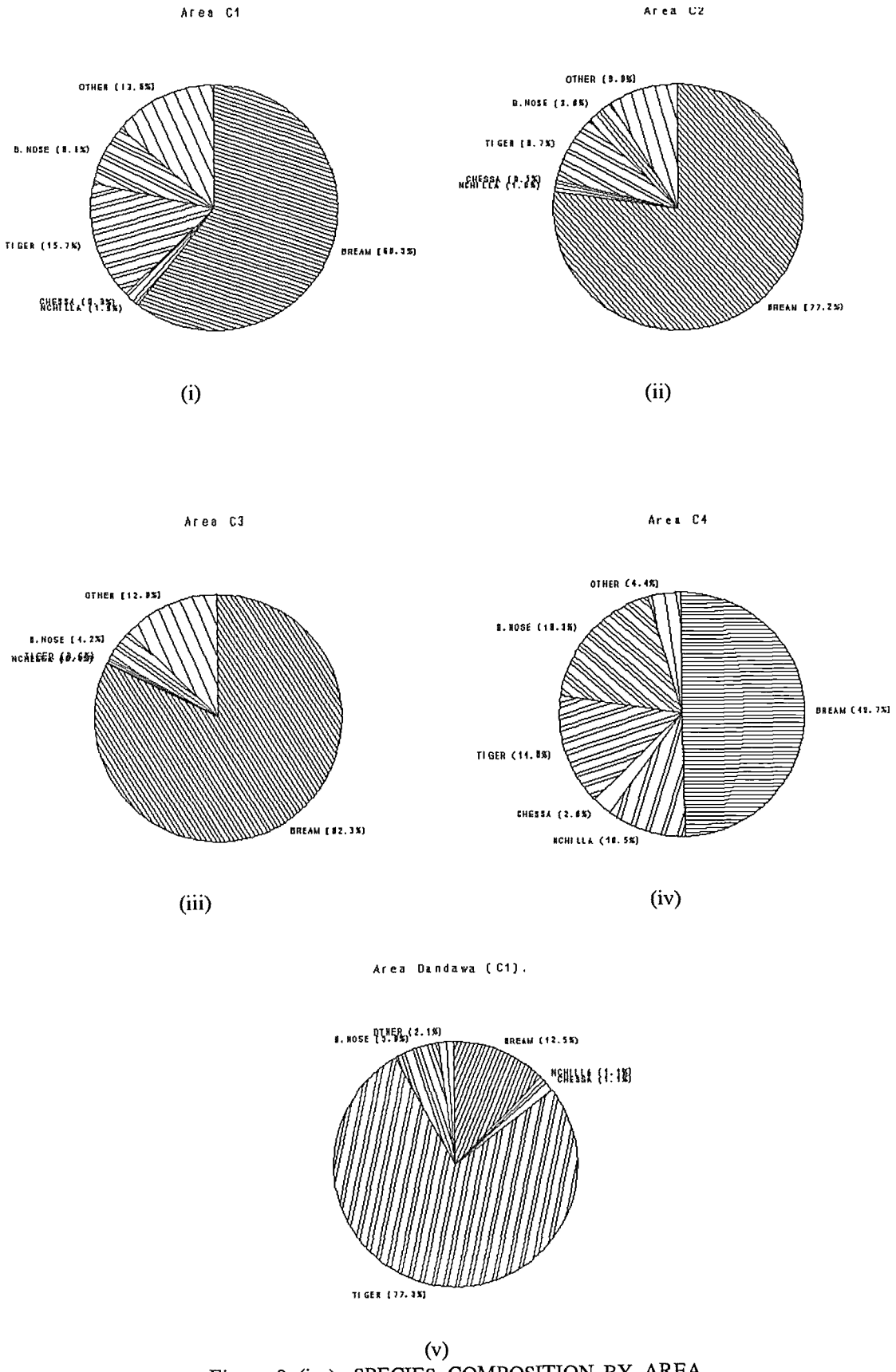


Figure 9 (i-v). SPECIES COMPOSITION BY AREA. 1991.

Figure 9 shows the species composition in enumerated areas. Dandawa camp was included because it has a species composition different from that of any of the camps. It is situated at the mouth of the Sanyati river ,has a relatively high abundance of tigerfish compared to the rest of the areas. Table 8 below also shows that this village has the highest catch compared to all fishing camps in area C1-C4. This high catch is attributed to higher effort (than allowed) being used in the camp and also to fishing in the river mouth.

TABLE 8

CATCH AND EFFORT SUMMARY FOR ENUMERATED VILLAGES (1991)

VILLAGE	EFFORT (M)	CATCH (TON)	CPUE (KG/100M)
FOTHERGILL	421786	27.56	6.53
GACHE	1143188	38.16	3.34
NYAODZA	393120	31.19	7.93
TSETSE	402933	38.02	9.44
NEMATOMBO	208440	18.13	8.70
MUDZIMU	168041	14.27	8.49
NYAMHUNGA	233365	14.99	6.42
MONGA	194593	14.72	7.56
DANDAWA	587382	103.65	17.65
LUANDO	444296	34.35	7.73
MUSAMBA	619051	129.08	20.85
CHALALA	265356	18.19	6.85
SIBILOBILO	806260	64.54	8.00
TOTAL	5887811	546.85	9.29

TABLE 9

AREA C1 CATCH AND EFFORT 1973-1991			
YEAR	EFFORT (M)	TOTAL CATCH (TON)	CPUE (KG/100M)
1973	4245514	87.77	2.07
1974	4067000	171.12	4.21
1975	5823454	216.14	3.71
1976	4693325	184.89	3.94
1977	2585583	100.17	3.87
1978	4232470	178.57	4.22
1979	3604010	168.15	4.67
1980	3435068	97.37	2.83
1981	2919457	72.17	2.47
1982	2614889	86.99	3.33
1983	3553053	77.73	2.19
1984	4459223	51.55	1.16
1985	2690008	29.9	1.11
1986	1730367	26.11	1.51
1987	2005549	129.15	6.44
1988	2420193	143.35	5.92
1989	2236510	112.77	5.04
1990	1890355	112.55	5.95
1991	1958094	96.91	4.95

TABLE 10

AREA C2 CATCH AND EFFORT 1973-1991			
YEAR	EFFORT (M)	TOTAL CATCH (TON)	CPUE (KG/100M)
1970	3504045	114.93	3.28
1971	2472359	67.09	2.71
1972	1852147	126.32	6.82
1973	6054815	199.04	3.29
1974	8699007	277.67	3.19
1975	9012427	311.97	3.46
1976	6745253	230.79	3.42
1977	8235006	234.84	2.85
1978	9856397	340.51	3.45
1979	no records	no records	no records
1980	5433118	187.98	3.46
1981	6050384	168.6	2.79
1982	5436199	164.06	3.02
1983	2540788	170.18	6.70
1984	4703577	417.03	8.87
1985	3321195	226.01	6.81
1986	2671602	255.45	9.56
1987	3223340	274.01	8.50
1988	2443409	242.02	9.91
1989	2691484	257.55	9.57
1990	1545481	244.46	15.82
1991	1794358	203.81	11.35

TABLE 11

AREA C3 CATCH AND EFFORT 1973-1991			
YEAR	EFFORT (M)	TOTAL CATCH (TON)	CPUE (KG/100M)
1972	no fishing	no fishing	no fishing
1973	3456725	97.18	2.81
1974	3473470	124.48	3.58
1975	3389575	78.13	2.30
1976	3079440	80.20	2.60
1977	2489851	75.35	3.03
1978	2616114	120.00	4.59
1979	2000135	119.73	5.99
1980	2452951	101.11	4.12
1981	2091404	66.77	3.19
1982	1642321	50.40	3.06
1983	1530166	37.43	2.44
1984	11503152	21.85	0.19
1985	13333335	16.30	1.22
1986	1180508	22.73	1.93
1987	599099	26.39	4.41
1988	2256450	193.08	8.56
1989	384749	34.93	9.07
1990	510048	30.63	6.01
1991	444296	35.35	7.73

TABLE 12

AREA C4 CATCH AND EFFORT 1970-1991			
YEAR	EFFORT (M)	TOTAL CATCH (TON)	CPUE (KG/100M)
1970	1179609	93.57	7.93
1971	1267308	91.96	7.26
1972	978530	78.15	7.99
1973	1551514	77.15	4.97
1974	1535458	84.21	5.48
1975	736212	58.29	7.92
1976	429982	31.92	7.42
1977	no records	no records	no records
1978	1291114	63.86	4.95
1979	no records	no records	no records
1980	1090772	66.59	6.10
1981	2063793	99.72	4.83
1982	1928563	78.58	4.07
1983	1001906	71.48	7.13
1984	1058426	54.03	5.10
1985	701275	110.01	15.69
1986	619018	109.28	17.65
1987	958678	143.52	14.97
1988	2256450	193.09	8.56
1989	1587782	198.33	12.49
1990	1108323	159.83	14.42
1991	1690667	152.98	9.04

TABLE 13

AREA C5 CATCH AND EFFORT 1973-1991			
YEAR	EFFORT (M)	TOTAL CATCH (TON)	CPUE (KG/100M)
1973	3840473	94	2.45
1974	3961230	107	2.70
1975	no records	no records	no records
1976	1094730	70	6.39
1977	no records	no records	no records
1978	no records	no records	no records
1979	no records	no records	no records
1980	574756	100	17.40
1981	2124842	177	8.33
1982	2131082	106	4.97
1983	3078396	83	2.70
1984	7385335	75	1.02
1985	2572756	80	3.11
1986	3985620	94	2.36
1987	1006188	41	4.07
1988	1345117	42	3.12
1989	3078394	112	3.64
1990	718900	88	12.24
1991	1112908	78	7.01

TABLE 14

AREA C6 and c7 CATCH AND EFFORT 1973-1991			
YEAR	EFFORT (M)	TOTAL CATCH (TON)	CPUE (KG/100M)
1989	176021	25.54	14.51
1990			
1991	219490	22.71	10.35

TABLE 15

TOTAL FISH PURCHASES (TONS) BY REGISTERED COMPANIES, 1989 & 1991.			
COMPANY	AREA	YEAR	
		1990	1991
INTER-AFRICA CONSULTANCY		7	
FRESHNET		220	295
O.LIEBERMANN	Sanyati East		
K.D.SMITH	Sanyati East	19	11.52
KARIBA BUTCHERY	Various		70.77
B/WATER CHARTERS		10	18.50
I & J	Sengwa Own	69	123.22
	Sengwa East	72	110.04
	Sengwa West	72	97.38
	Chalala	50	12.60
	Luando	18	58.93
	Sanyati East	44	68.12
	Fothergill	23	38.36
	Nyaodza	16	49.41
	Various Traders	53	93.84
TOTAL		673	1047.69

The above table gives the purchases by I & J and other companies. These data give an indication of how much of the fish is marketed fresh. It is estimated that 60% of the landing are marketed as fresh through the above companies. This then gives an estimate of 1 746.67 tonnes in the inshore.

ACKNOWLEDGEMENTS.

All the people who provided data used in this report are most gratefully thanked. The co-operation of commercial fishermen, Binga District Council and the Institute staff is appreciated. The co-operatives in area C1 (inshore) and all companies purchasing fish are sincerely thanked for providing their monthly returns.

Our special thanks go to Mrs Gapara and Miss Muchabaiwa who helped with the production of this report.